

Name:

ID:



University of Bahrain
CE -- CIT -- UOB

TEST 1 (28 April 2015) ITCE 444: μ P-Based Design

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Time: 60 minutes

31 May 2015

Q1. [30 marks]

If PORTC = 2, after running the following instructions, what will be the contents of WREG, PORTD and status flags?

```
ORG    0
SETF   TRISC
CLRF   TRISD
MOVF   PORTC, W
```

```
CALL    TABLE
MOVWF   PORTD
NEGf    PORTD
```

TABLE :

```
MULLW  0x2
MOVFF   PRODL, WREG
ADDWF   PCL
RETLW   0
RETLW   1
RETLW   3
RETLW   5
RETLW   7
RETLW   9
RETLW   10
RETLW   13
END
```

PTO



Q2. [30 marks]

a) How long will it take to run the following procedure? Assume 8MHz clock :

```
R1    EQU    0X10
R2    EQU    0X11
R3    EQU    0X12
      ORG    0X1234
      MOVLW  2
      MOVWF  R1
      MOVLW  3
      MOVWF  R2
      MOVLW  4
      MOVWF  R3
LOOP: DEC     R3
      BNZ    LOOP
      DEC    R2
      BNZ    LOOP
      DEC    R1
      BNZ    LOOP
      HERE: GOTO  HERE
```

b) Assemble the following two lines of the above program:

GOTO HERE and the last **BNZ LOOP**

Q3. [40 marks]

Write a program to calculate Z in the following equation and save it in 0x200 :

$$Z = (A \times B + C \times D) + F$$

Where A, B, C, D and F are unsigned bytes at 0x100, 0x101, 0x102, 0x103 and 0x104